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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,591	12/04/2003	Seok-Kyu Lee	LEPA122044	8962
26389 7590 12/07/2007 CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC 1420 FIFTH AVENUE SUITE 2800 SEATTLE, WA 98101-2347			EXAMINER CHACKO DAVIS, DABORAH	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 12/07/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/728,591	Applicant(s) LEE ET AL.	
	Examiner Daborah Chacko-Davis	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 15-18, 20-22, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,370,013 (Iino et al., hereinafter referred to as Iino) in view of U. S. Patent Application Publication No. 2003/0128496 (Allen et al., hereinafter referred to as Allen).

Iino, in col 6, lines 14-65, in col 7, lines 1-34, in col 17, lines 22-49, in col 19, lines 50-60, in col 28, lines 55-67, in col 29, lines 1-67, in col 30, lines 1-15, discloses a printed circuit board comprising a dielectric substrate laminate (non-copper clad laminate, see figure 1), having a plurality of via holes, and a capacitor paste filled in the via holes (capacitor embedded in the dielectric substrate laminate), forming conductor layers (copper foil layers, wiring circuit layers) on either sides of the capacitor, and forming internal electrodes (top and bottom electrodes) and/or circuitries (see figure 9), followed by laminating resin coated copper foil layer on the electrodes (resin adhesive coating covered with a copper foil layer), forming via holes and thru-holes in the outer layers (copper foil layer), plating the via holes (reference 15 of figure 1) and the through holes (reference 13 of figure 1). Iino, in col 6, lines 15-17, discloses that the wiring

board has a cavity formed inside thereof (via) and that the cavity is filled with the capacitor, and as disclosed in figure 1, the via is filled with the capacitor upto its perimeter (see reference 3). lino, in col 13, lines 1-13, discloses that the capacitor embedded is in contact with top and bottom electrodes disposed above and below the capacitor (claim 15). lino, in col 8, lines 53-67, in col 9, lines 1-43, discloses that the dielectric substrate in which the capacitor is embedded is formed by a composite material of thermosetting resin and an inorganic filler, wherein the inorganic filler can be glass (FR4 insulator, FR4 is the common name for a PCB core dielectric substrate that is a glass or ceramic reinforced or filled epoxy resin) (claim 16). lino, in col 21, lines 51-55, discloses that the capacitor paste (filling the capacitor dielectric sheet with conductive paste prior to laminating) was filled in by screen printing (claim 17). lino, in col 14, lines 4-60, in col 16, lines 39-49, discloses that the capacitor material (capacitor paste) is BaTiO₃ ceramic filler particles dispersed in epoxy resin and is a highly dielectric composite and inherently possesses the claimed dielectric strength (claim 18). lino, in col 29, lines 32-67, in col 30, lines 1-15, discloses that the resin adhesive coated copper foil layers were laminated by a build-up process (claim 20). lino, in col 8, lines 6-7, and in figures 4A through 4D, discloses that the via holes (outer via holes) are formed by laser machining (laser drill) (claim 21). lino, in col 16, lines 27-31, and in col 29, lines 23-25, discloses that the through hole cavity can be formed by drilling or punching (mechanical drill) (claim 22).

The difference between the claims and lino is that lino does not disclose that the top or bottom electrode contacts the capacitor in the area defined by the perimeter of the via hole.

Allen, in [0017], discloses that the embedded capacitor is in intimate contact with the top and bottom electrodes.

Therefore, it would be obvious to a skilled artisan to modify lino by employing the method of positioning the electrodes in intimate contact with the capacitor in the via as taught by Allen because lino, in col 13, lines 1-16, discloses that the electrodes are positioned on the bottom and top of the capacitor and Allen, in [0017], discloses that capacitors that are in embedded form should be in intimate contact with the electrodes (top and bottom).

3. Claim 19, is rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,370,013 (lino et al., hereinafter referred to as lino) in view of U. S. Patent Application Publication No. 2003/0128496 (Allen et al., hereinafter referred to as Allen) as applied to claims 15-18, 20-22 above, and further in view of U. S. Patent Application Publication No. 2004/0116919 (Heim et al., hereinafter referred to as Heim).

lino in view of Allen is discussed in paragraph no. 2.

lino, in col 14, lines 4-60, in col 16, lines 39-49, discloses that the capacitor material (capacitor paste) is BaTiO₃ filler particles dispersed in epoxy resin in the claimed ratio and is a highly dielectric material and inherently has the claimed dielectric constant (claim 19).

The difference between the claim and lino in view of Allen is that lino in view of Allen does not disclose that the dispersed BaTiO₃ powder has the claimed coarse particle diameter and the fine particle diameter.

Heim, [0130], and [0131], discloses that different sizes of BaTiO₃ powder is blended with epoxy in the claimed volume ratio to form a highly dielectric material, wherein the BaTiO₃ powder particles posses different sizes that range from about 40 microns to less than 0.05microns (coarse particles and fine particles).

Therefore, it would be obvious to a skilled artisan to modify lino in view of Allen by employing the barium titanate powder that has particles of different sizes as suggested by Heim because Heim, in [0130], and [0131], discloses that different particles sizes of the powder can be blended inorder to form a slurry and then combined with a suitable epoxy so as to form insulating coating material.

Response to Arguments

4. Applicant's arguments, see Amendment and Remarks, filed September 13, 2007, with respect to claim 15, have been fully considered and are persuasive. Therefore, the 102 rejection made over claims 15-18, and 20-22, in the previous office action (paper no. 20070611) has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U. S. Patent Application Publication No. 2003/0128496 (Allen et al).

A) Applicants argue that lino et al., does not disclose various elements such as, a capacitor paste that fills the inner vial holes to the perimeter, top and

bottom electrodes on and below the capacitor paste that contact the capacitor paste at least over the area defined by the perimeter of the via hole, and resin coated copper layers laminated to the bottom electrodes.

lino teaches forming a via and filling the via (cavity) with a capacitor upto to the perimeter of the cavity (see figure 1, reference 3), positioning top and bottom electrodes on the capacitor, and applying a resin on the layers on the capacitor and applying a copper foil on the resin i.e., resin coated copper layer formed on the electrodes (bottom or top). However, lino, as illustrated in figure 2A, does not teach that the entire perimeter-area of the via hole (capacitor) is not in contact with the electrodes, only corners and edges are in contact with the electrodes (top or bottom). Allen is depended upon to disclose the intimate contact of the capacitor (entire surface of the embedded capacitor, includes the area of the perimeter) with the top or bottom electrode.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR)

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system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

A handwritten signature in black ink, appearing to read "Deborah A. Davis", is written over a horizontal line.

December 3, 2007.